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UTILIZATION OF TACTICAL COMPUTERS FOR TRAINING:

FIELD EVALUATION PLAN

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System Development Corporation

MANPOWER AND EDUCATIONAL SYSTEMS TECHNICAL AREA

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This report describes Phase V in the development of TACFIRE Automated Instruction (AI) courseware. The overall project is aimed at extending the scope of CAI to the development of self-instructive procedures and programs for users of tactical data processing systems. This report covers the evaluation plan as such: procedures and methodology for performing a review of the TACFIRE courseware content, procedures and requirements for demonstrating the execution of TACFIRE courseware on the ARI and TACFIRE operating systems and the procedures for assessing the acceptability of TACFIRE AI

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courseware by field artillery personnel.

UTILIZATION OF TACTICAL COMPUTERS FOR TRAINING: FIELD EVALUATION PLAN

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5 DECEMBER 1975

TM-5544/002/00

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I. INTRODUCTION

This Research Note, Utilization of Tactical Computers for Training: Field Evaluation Plan, describes Phase V in the development of TACFIRE Automated Instruction (AI) courseware. Figure 1 depicts the five phases that constitute the total project effort.

The overall project aim is to extend the scope of the application of computer-assisted interaction (CAI) to the development of self-instructive programs and procedures for users of tactical data processing systems. The basic approach is to provide AI training subsystem packages which can be run on the operating system and, when not used for tactical operations, to provide initial and refresher training in system use. The overall objective of this work effort is the development of stand alone CAI courseware appropriate to the training of users of the TACFIRE system. Project products will provide the foundation for subsequent evaluation and refinement of CAI technology as applied to training in tactical systems.

The purpose of Phase V is to develop an evaluation plan for demonstrating the execution and effectiveness of the entire TACFIRE AI courseware package. The evaluation plan covers: (1) procedures and methodology for performing a review of the TACFIRE courseware content by subject matter experts at the U.S. Army Field Artillery School, Fort Sill, Oklahoma; (2) procedures and requirements for demonstrating the execution of TACFIRE courseware on the ARI and TACFIRE operating systems; and (3) procedures for assessing the acceptability of TACFIRE AI courseware by field artillery personnel.

The evaluation plan will be reviewed by the U.S. Army Research Institute (ARI) in conjunction with the U.S. Army Field Artillery School. Implementation of the evaluation plan and the formative evaluation of the instructional effectiveness of the learning materials will be the responsibility of ARI. Prior to the implementation of the evaluation plan, the courseware will have been debugged so that it executes properly on the AN/GYK-12 computer.

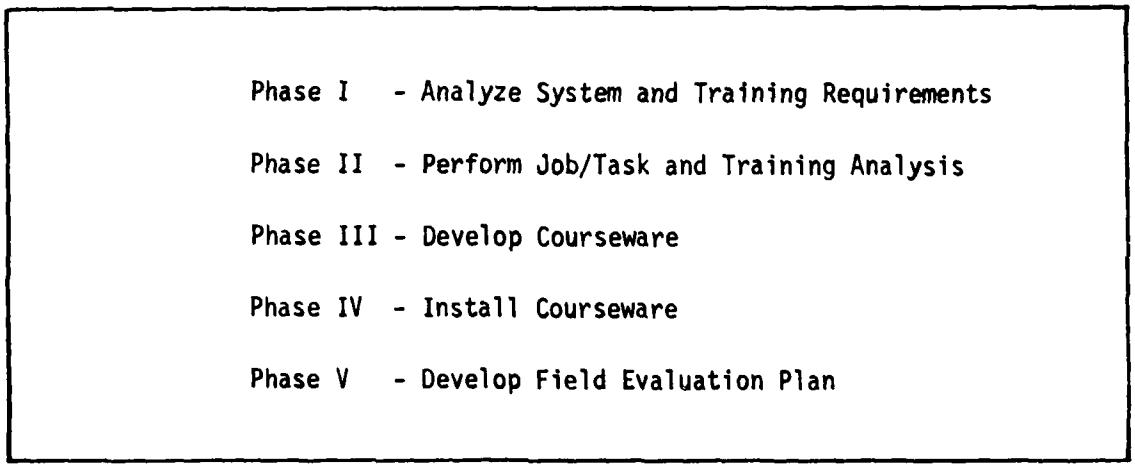

Figure 1. Utilization of Tactical Computers for Training: Major Project Phases

II. REVIEW OF TACFIRE AI COURSEWARE

TACFIRE AI courseware is an operational training program with an expected use in TACFIRE field units and at the U.S. Army Field Artillery School (USAFAS). The review process has the purpose that the training analysis products (criterion and enabling objectives, test items, etc.) and courseware accurately reflect TACFIRE operations, procedures, content, doctrine, and tactical use as employed on the job in the field situation. The review process also ensures that the courseware executes properly on the TACFIRE equipment. The U.S. Army Field Artillery School (USAFAS) has TACFIRE subject matter experts and operational TACFIRE equipment at the persent time. It is expected that the review of the TACFIRE AI courseware will take place at USAFAS, Fort Sill, Oklahoma.

The review process is expected to follow the training development process to logically proceed from course objectives to course content to execution of courseware.

A. Review of Course Objectives

The training tasks, criterion and enabling objectives, and test items to be included in the course are defined in the Phase II report, "Utilization of Tactical Computers for Training: Job Task Training Analysis," TM-5544/001/00, dated 20 August 1975.

This portion of the review is to examine the job/task training analysis (Phase II) report and indicate modifications to the criterion and enabling objectives and/or accompanying test items.

The number of reviewers required should be determined by the USAFAS. Even for subject matter experts, there are certain areas an individual knows very well but other areas are better known by other subject matter experts. Also, the amount of material to be reviewed lends itself to different subject matter experts reviewing different areas.

The actual procedure recommended for carrying out the review is to use copies of the Phase II report to note discrepancies and corrections. The notation should not only identify (mark) the problem area but also indicate why it is wrong. A separate list of the pages on which these occur would ensure that none are overlooked. It it suggested that one of the Phase II reports be used as a "master" copy for all changes which, in turn, will be used to identify where changes should be made in the course content. The audit trail used pinpoints where in the course content the change is to be made. The intent of this procedure is to minimize the amount of paperwork and number of documents required to identify, specify, and record what needs to be changed. The report itself can be easily used for this purpose.

B. Review of Course Content

This review is concerned with the accuracy of the courseware and consists of an off-line (off computer) check of the accuracy of the course content using the computerized listing (printouts) of the course.

Listings (printouts of course card decks) provide the entire course content including the instructional text, test items, answer processing, feedback, branching, remedial instruction, and decisions made (decision frames) which determine the student's progress through the course.

The listings provide an easy method of reviewing course content and identifying and recording problem areas. The subject matter experts should be familiar with the PLANIT symbology (B:) used for branching in order to tie together the frame sequences including remedial instruction. Knowing how to interpret decision (D) frames would also be helpful in determining the adequacy of the pass-fail levels for the tests at the end of each lesson and module.

The procedure recommended is to go through the course with the off-line course exhibits and identify on the listing and/or exhibits discrepancies and questionable areas which may exist along with notations which specify why it is a discrepancy. The listing thus provides a record of the discrepancies, minimizing the paper work and record keeping required. One copy of the listings and off-line course exhibits should be a "master" copy to show all changes which should be effected. These changes can then be made (edited) easily on-line to update the course content.

C. Review of Execution of TACFIRE Courseware

The TACFIRE AI courseware needs to be run on line to ensure that the courseware can be run (executed) on the TACFIRE computer system and that the frame size including feedback and the following frames fit the configuration of the TACFIRE CRT display (C/ED) and programming parameters. The content should be also checked as the individual frame-by-frame presentation on the CRT may appear different than on the listing, as there is no opportunity to refer to a number of frames at the same time on the C/ED. This is particularly true of test items which should be examined closely to determine that enough of the situational context of the question is given to adequately respond to the test question.

The procedure is simple. A reasonable check can be made by going through the entire course, once with all correct responses and a second time with all incorrect responses. The subject matter experts should take the course in the "author" mode which will permit them to continue if they encounter problems within the on-line material. Each examines the content of the course and uses the listing to provide the correct or incorrect response and to record where problems occur and what the problem is, including possible feedback from the PLANIT system. This procedure is facilitated by having the Electronic Line Printer (ELP) in the "on" status. This will provide a record of the actions (responses) taken while running the course. At the end of the run, PLANIT student records should be obtained.

The problem areas that are identified (content and execution) need to be analyzed to determine the corrective action to be taken. Changes to the courseware are easily made by on-line editing. These changes are recorded on the listing to provide an updated record of the course content.

III. TRAINEE ACCEPTABILITY OF TACFIRE AI COURSEWARE

Subject matter experts provide feedback on content validity and organization of the course and the fact that the courseware executes (runs) properly on the TACFIRE system. TACFIRE trainees provide feedback on levels of understanding and mastery and interactive computer behavior, verifying that the courseware executes and is acceptable.

Having TACFIRE trainees take the TACFIRE AI course provides answers to two basic questions: (1) Do they learn the TACFIRE operations specified in the objectives?; and (2) What attitude do they have toward the TACFIRE AI course? The first question is answered by analyzing trainee results on the criterion tests covering the objectives. The second question is answered by obtaining trainee reaction to the learning process by a structured, semi open-ended questionnaire upon completion of the course. Implicit in both questions is whether the TACFIRE AI course is "GI proof." Experience with trainees during the evaluation study should provide some indication of this as will earlier runs using military personnel for course checkout.

A. Trainee Selection Requirements for the Evaluation Study

The TACFIRE AI course is intended to train field artillery personnel in TACFIRE Battalion Fire Direction Center operations. Trainees selected for the evaluation process should be representative of the pool of field artillery personnel who would be selected for TACFIRE FDC training. Only in this way can the results obtained be easily generalized to the larger group. This also applies to the prerequisites for selection to TACFIRE training. A number of these factors for selecting trainees for the evaluation study are considered in the paragraphs which follow.

1. Field Artillery Skills and Knowledge

The primary positions in the TACFIRE Battalion FDC operations are the Fire Direction officer (Captain), MOS 01193 and the Fire Direction Sergeant (E6), MOS

13E30. Each of these positions is expected to be filled by experienced field artillery personnel.

The prerequisites required for the Fire Direction Sergeant are: E4 or above, qualified in MOS 13E, MOS evaluation score of 100 or more on the latest Enlisted Evaluation Data Report. For the Fire Direction officer, the prerequisites are: a graduate of the Field Artillery Officer Basic Course and have 18 months of active duty remaining at the completion of the course.

Selection Requirement: Personnel selected for the evaluation study should reasonably meet the above criteria. Personnel files of those being considered for the study should be checked to verify that they do.

Potential Assignment to TACFIRE. The TACFIRE AI course is intended to train TACFIRE personnel. Those in the personnel pool for selection for TACFIRE training have a reasonable expectation that, if selected, they will be assigned to TACFIRE or need to know TACFIRE operations. Consequently, they are motivated to learn TACFIRE operations.

Personnel selected for the evaluation should also have a reasonable expectation that they will need to know TACFIRE operations and, consequently, have the same level of motivation to learn. Note that this does not imply that there is a high level of motivation but simply that the skills and knowledges learned will be of value to the trainee. Personnel who are awaiting discharge, reassignment, or are presently assigned to areas other than field artillery operations should not be selected to participate in the evaluation.

Selection requirement: Current or potential assignment to TACFIRE operations or a duty position requiring TACFIRE skills and knowledges.

Reading and Visual Skills. TACFIRE FDC operations personnel need to see, read, and interpret various displays and devices (RD, CED, ELP, DPM) and have the verbal skills to understand and communicate with field artillery personnel on field artillery operations. A minimum reading level is required as well as no disqualifying visual handicaps.

Selection Requirement: Minimum ACB GT score of 90 or above (8th grade) and no disqualifying visual handicap on Physical Status Profile (PULHES).

When levying personnel requirements for an evaluation study, the normal procedure for the organization being levied upon is to send whatever personneol are available at the time that will fill the requirement. This often results in a "warm body" syndrome that may give atypical personnel. A better procedure is to analyze the personnel pool beforehand and provide the supplying organization with a list of qualified personnel from which to select a certain number for the period specified. This provides flexibility for the supplying organization and ensures obtaining personnel representative of the TACFIRE selection pool.

Number of Trainees Required for the Evaluation Study. Careful controlled preselection of trainee personnel to ensure they are typical candidates for TACFIRE training reduces the number required for the evalution study. Nonqualifying individuals are eliminated from the study as are those with reading or visual handicaps and those with no inherent interest in TACFIRE training.

If the course is effective, scores on the criterion tests should cluster at the high end of the scale. If the course is not effective, scores should cluster at the low end of the scale. This should be a fairly constant factor, whether a large number or small number of trainees are used.

However, no matter how good preselection procedures are, there is the occasional "maverick" who doesn't like any kind of training, won't learn or can't learn because of personal problems or bias. There is also the "maverick" who seems to learn no matter how or what material is presented. Any one individual has an equal probability of being selected as any other one individual in the selection pool. This applies to both the high and low ends of the spectrum. The number of trainees selected for the evaluation study should be large enough to easily identify (isolate) the occasional individual at one or the other extreme and still indicate what group performance will be.

Another consideration is that, at present, there is little data on measured performance relative to pass-fail (go-no go) scores. Usual methods of determining pass-fail scores may be inappropriate. Prior to the evaluation study, each functional area module test will have been reviewed by subject matter experts and considered valid measures of performance for the stated objectives. In considering pass-fail scores, an upper limit of test scores for trainees could be those test scores obtained by subject matter experts and instructors. However, setting a pass-fail score in this fashion may be too low. Previous research (Navy Computer Integrated Instruction [CII]) indicates that it is not uncommon for subject matter experts (instructors) as a group to have mean scores of 74 to 89% (median of 76%) on various test modules that comprehensively cover the functional areas being taught. Another criteria for pass-fail scores, used for many military courses, is a score of 70 or 75%. For MOS proficiency test scores, in some cases, the passing score is fairly close to the chance score that could be obtained by randomly answering all the multiple choice questions. Both 70% or subject expert scores may be too low. The number of trainees selected for the evaluation study should be therefore large enough to provide a reasonable measure of performance expected (pass-fail) as a result of taking the course.

Another consideration is to determine the internal consistency of the course. If the errors made by trainees are randomly distributed over performance

objectives, the modules can be considered satisfactory. However, if a number of trainees fail particular test items covering specific objectives, then the training given is suspect and should be revised. The number of trainees should be large enough so that poor performance areas can be isolated. The audit trail readily links together course content, objectives, and test items.

Based upon the above considerations, the number of trainees recommended for the evaluation study is ten (10), all of whom meet the prerequisites for TACFIRE training. This will provide for significant clusters of scores on the module tests and easily isolate individuals with atypical performance. It will provide objective data to tentatively establish pass-fail (go no-go) scores, provide a measure of the internal consistency of the course content, and the range of training time required to take the course. It is also sufficiently large to provide some measure of confidence that the results obtained will apply to the larger pool of TACFIRE trainees.

C. Equipment, Support Requirements and Schedule

1. Equipment

The TACFIRE AI course is designed to run on the TACFIRE Fire Direction System. It is expected that the evaluation study will take place on the TACFIRE system at the U.S. Army Field Artillery School, Fort Sill, Oklahoma. Trainees taking the course will use one of three types of devices available: (1) the ACC console, (2) the VFMED, or (3) the modified MIOD. It is expected that the availability of equipment will provide a distribution of equipment users, e.g., some on ACC, some on VFMED and MIOD, and some on a combination of ACC and VFMED/MIOD.

2. Support Requirements

Personnel will be required for the operation of the TACFIRE tactical equipment. Support personnel for the evaluation study are dependent on the number of trainees taking the AI course at any given time. A minimum of two evaluation personnel is recommended. Their functions fall into two general areas: (1) load the PLANIT system and AI courseware onto the TACFIRE system and obtain

the PLANIT trainee records at the end of each session; and (2) conduct and monitor the evaluation study including briefing the trainees at the beginning of the course, completing the forms required and interviewing each trainee at the end of the course. The TACFIRE AI course runs by itself and trainees work at their own pace. Course completion times will differ and the end of course interviews conducted will be spread over a period of time, necessitating a minimum number of support personnel. All course materials and data gathering forms are provided. Other than the operational equipment and ELP printouts of student records, the additional support requirements anticipated are two tape recorders, 10 tape cassettes to tape the interviews, and table and chairs in a quiet place to conduct the interviews.

3. Schedule

A two-week maximum liability period for each trainee is recommended. This should allow the slowest trainees, working at their own pace, to finish the course. The TACFIRE AI course, still under development, is currently estimated to take approximately 25 hours of on-line instruction on the ACC. The other two devices will require a somewhat longer time period because of the additional steps required for the trainee to enter his response. Assuming the 25 hours is reasonable, trainee times (working at their own individual pace) will probably range from 20 to 40 hours, with the median times around 25 hours.

Considering the initial briefing, forms to be filled out, the interview, possible TACFIRE system down time, the normal vagaries of other military and personal requirements, the two-week maximum liability period seems reasonable and adequate for planning purposes at this time. After the TACFIRE AI courseware has been developed and run on the TACFIRE system, the estimated time required can be verified.

The availability and status of the equipment consistent with other requirements at the Field Artillery School will determine when trainees can get on the TACFIRE

system and also the number of trainees who can take the course at any one time. As far as the evaluation study is concerned, trainees can take the course individually or all at the same time. A rigid time schedule is not required since PLANIT has a complete record-keeping capability. The trainee can sign off at any time and PLANIT will start him at his place in the course when he returns. There are "natural" places to end a day's session, as at the end of a lesson or end of a module. Trainees can be expected to leave at different times.

Procedures

Initial Activities. Trainees will report to the monitor, fill out the introductory form (Figure 2), and be briefed onthe TACFIRE AI course. The monitor establishes a file (individual folder) for each trainee which also contains the TACFIRE Course Data Sheet (Figure 3).

Taking the TACFIRE AI Course. After assignment to a console, trainees follow the printed instructions (Figure 4) and log in with their trainee ID number. They then take the course. For lunch and other breaks and at the end of each daily session, students log off and then log in again when they return to resume. Students are free to take coffee or latrine breaks whenever they so desire during each session. Trainee activities are monitored and also logged on and off manually by the group monitor. System downtimes are also recorded by the monitor. Trainees continue to take the course until completion including the module tests which are given on-line as part of the course.

Interview. At the time he completes the TACFIRE AI course, each trainee is interviewed in depth in regard to their experience with TACFIRE AI.

TACFIRE COURSE DATA QUESTIONNAIRE

NAME _____ DATE _____

SSAN _____ GRADE _____ TIME IN GRADE _____ MOS _____

JOB TITLE _____

UNIT _____

PHONE NUMBER _____ DATE OF BIRTH _____

LENGTH OF SERVICE _____ ETS DATE _____

FIELD ARTILLERY EXPERIENCE:

1. DATE: FROM _____ TO _____ GRADE _____ MOS _____

   DUTY POSITION _____ LOCATION _____

2. DATE: FROM _____ TO _____ GRADE _____ MOS _____

   DUTY POSITION _____ LOCATION _____

Figure 2. Introductory Form.

TACFIRE COURSE DATA SHEET

ID NUMBER: 1. _____ 2. _____ 3. _____ DATE _____

NAME _____ GRADE _____ SSAN _____

MOS _____ JOB TITLE _____

ORGANIZATION _____

PHONE NUMBER _____ DATE OF BIRTH _____

GT SCORE _____ EDUCATION _____ LENGTH OF SERVICE _____
(Grade Completed or Degree)

LATEST MOS EVALUATION SCORE _____ MOS _____ DATE _____

ETS DATE _____

MODULE 1.

CONSOLE ASSIGNED: ACC _____ VFMED _____ MIOD _____

START DATE AND TIME _____ END DATE AND TIME _____

ON CONSOLE TIME

DAY 1: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 2: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 3: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

SYSTEM DOWN TIME

1. DATE _____ FROM _____ TO _____ 2. DATE _____ FROM _____ TO _____
3. DATE _____ FROM _____ TO _____ 4. DATE _____ FROM _____ TO _____

TOTAL TIME ON CONSOLE _____

FIRST TEST SCORE _____ TIME REQUIRED _____

SECOND TEST SCORE _____ TIME REQUIRED _____

Figure 3. TACFIRE Course Data Sheet.

MODULE 2.

CONSOLE ASSIGNED: ACC _____ VFMED _____ MIOD _____

START DATE AND TIME _____ END DATE AND TIME _____

ON CONSOLE TIME

DAY 1: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 2: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 3: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

SYSTEM DOWN TIME

1. DATE _____ FROM _____ TO _____ 2. DATE _____ FROM _____ TO _____
3. DATE _____ FROM _____ TO _____ 4. DATE _____ FROM _____ TO _____

TOTAL TIME ON CONSOLE _____

FIRST TEST SCORE _____ TIME REQUIRED _____

SECOND TEST SCORE _____ TIME REQUIRED _____

MODULE 3.

CONSOLE ASSIGNED: ACC _____ VFMED _____ MIOD _____

START DATE AND TIME _____ END DATE AND TIME _____

ON CONSOLE TIME

DAY 1: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 2: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 3: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

SYSTEM DOWN TIME

1. DATE _____ FROM _____ TO _____ 2. DATE _____ FROM _____ TO _____
3. DATE _____ FROM _____ TO _____ 4. DATE _____ FROM _____ TO _____

TOTAL TIME ON CONSOLE _____

FIRST TEST SCORE _____ TIME REQUIRED _____

SECOND TEST SCORE _____ TIME REQUIRED _____

Figure 3. TACFIRE Course Data Sheet (Cont'd).

MODULE 4.

CONSOLE ASSIGNED: ACC _____ VFMED _____ MIOD _____

START DATE AND TIME _____ END DATE AND TIME _____

ON CONSOLE TIME

DAY 1: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 2. 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 3: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

SYSTEM DOWN TIME

1. DATE _____ FROM _____ TO _____ 2. DATE _____ FROM _____ TO _____
3. DATE _____ FROM _____ TO _____ 4. DATE _____ FROM _____ TO _____

TOTAL TIME ON CONSOLE _____

FIRST TEST SCORE _____ TIME REQUIRED _____

SECOND TEST SCORE _____ TIME REQUIRED _____

MODULE 5.

CONSOLE ASSIGNED: ACC _____ VFMED _____ MIOD _____

START DATE AND TIME _____ END DATE AND TIME _____

ON CONSOLE TIME

DAY 1: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 2: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

DAY 3: 1. FROM _____ TO _____ 2. FROM _____ TO _____
3. FROM _____ TO _____ 4. FROM _____ TO _____

SYSTEM DOWN TIME

1. DATE _____ FROM _____ TO _____ 2. DATE _____ FROM _____ TO _____
3. DATE _____ FROM _____ TO _____ 4. DATE _____ FROM _____ TO _____

TOTAL TIME ON CONSOLE _____

FIRST TEST SCORE _____ TIME REQUIRED _____

SECOND TEST SCORE _____ TIME REQUIRED _____

Figure 3. TACFIRE Course Data Sheet (Cont'd).

SUMMARY

MODULE 1:

TIME REQUIRED _____ TEST SCORE _____ TEST TIME _____

CONSOLE: ACC _____ VFMED _____ MIOD _____

MODULE 2:

TIME REQUIRED _____ TEST SCORE _____ TEST TIME _____

CONSOLE: ACC _____ VFMED _____ MIOD _____

MODULE 3:

TIME REQUIRED _____ TEST SCORE _____ TEST TIME _____

CONSOLE: ACC _____ VFMED _____ MIOD _____

MODULE 4:

TIME REQUIRED _____ TEST SCORE _____ TEST TIME _____

CONSOLE: ACC _____ VFMED _____ MIOD _____

MODULE 5:

TIME REQUIRED _____ TEST SCORE _____ TEST TIME _____

CONSOLE: ACC _____ VFMED _____ MIOD _____

INTERVIEW: DATE _____ START TIME _____ END TIME _____

INTERVIEWER _____ TAPED: YES _____ NO _____

Figure 3. TACFIRE Course Data Sheet (Cont'd).

When you see	Type (Exactly as spaced) and Enter
LOG IN OR END	
*	Your I.D. - example H2304163,
ENTER COMMAND	
*	GET FM1
IDENTIFY YOURSELF	
*	Your I.D. - example H2304163
When you take a break	<FINISHED

Figure 4. Trainee Log On and Log Off Instructions.

The interviews are conducted using the TACFIRE AI Debriefing Questionnaire (Appendix A) as a basis. The trainee is asked whether he has any objection to the interview being recorded (taped). If he does not, the interview is recorded using the tape cassette recorder. Other checks on the Privacy Act of 1974 restraints should also be made. The interviewer fills out the interview form based upon the trainee's responses. To assist in this process, the trainee is given a copy of the blank interview form. Some questions are open-ended and others require a specific response. Trainees are encouraged to amplify their responses.

The interview should take place in a quiet location where there will be little disruption in terms of background noise or curious onlookers.

End Activities. The monitor should obtain the PLANIT trainee records and place them in the individual file along with the other records and forms completed, including the record or system down time for each trainee. These are used for the analyses which follows. Each trainee file should contain the following:

1. TACFIRE Introductory Form
2. TACFIRE Course Data Sheet
3. Complete PLANIT Trainee Performance Records for all modules including test scores and on-line times
4. The completed AI Debriefing Questionnaire and Tape Cassette Record of the interview
5. Comments of the monitor.

In addition, the monitor should secure the off-line materials (exhibits) and module test exhibits.

ANALYSIS OF THE DATA

The two questions to be answered in the anlaysis are: (a) Do trainees learn the TACFIRE operations specified in the objectives?, and (b) What attitude do the trainees have toward the TACFIRE AI courseware? Answers to the first question are obtained by analyzing the PLANIT trainee records. Answers to the second question are obtained by analyzing the trainee resposes to the TACFIRE AI Debriefing Questionnaire.

Do Trainees Learn? Two sets of date with summary statistics should be compiled. One for trainees characteristics, the other for trainee performance.

Trainee Characteristics. A summary ssheet should be prepared showing the data for each trainee on the TACFIRE course data sheet (Figure 5). Frequency distributions of each variable should be obtained as well as the mean, standard deviation, and range of values for the variable, GT score, mean = 104.5, standard deviation of 7.5, range 96 to 125. These are compiled to (a) determine that the selection criteria have been met, (b) allow later comparison against course results, and (c) determine the distribution of characteristics in the trainee sample.

Trainee Number	GRADE	MOS	AGE	GT Score	Education, etc.
1	E6	13E30	27	108	12
2	E4	13E20	22	117	14
3	E6	13E30	26	102	12

Figure 5. Summary of Trainee Characteristics

Trainee Performance. A summary sheet should be prepared showing the course data for each trainee time required for each module, module test score, total time required for the course, and average of his module test scores. Frequency distributions of each variable should be obtained as well as the means, standard deviation and range of values for the variable, FM Module, Module time, mean = 11.2 hours, standard deviation of 1.6, range 9.5 to 14.2 hours.

To answer the question "Do trainees learn?" the frequency distributions of test scores for each module is examined (Figure 6). For Modules 1 and 2 the criterion test scores in this hypothetical example would indicate that the trainees do learn. For Module 3, the training given is suspect. Further analysis is required. This is done by compiling the frequency distribution of errors (missed items) on the Module 3 test (Figure 7). The frequency distribution, in the example given, shows that the problem area is concentrated in test items 7 through 13. This part of the module, both content and test items, should be analyzed to determine what the problems are and either cointent, test items or both should be revised.

In addition to the above analysis (and assuming trainees do learn the stated objectives, the relationship of trainee characteristics to learning is of interest. It is suggested that scatterplots be made showing the relationship between such variables as GT, age, education, etc., and test score. The scatterplots will easily show if such a relationship exists. Because of the relatively small number of trainees (10), the results can only be considered indicative rather than definitive. They do represent an opportunity to obtain as much data from the study as possible with relatively little added effort.

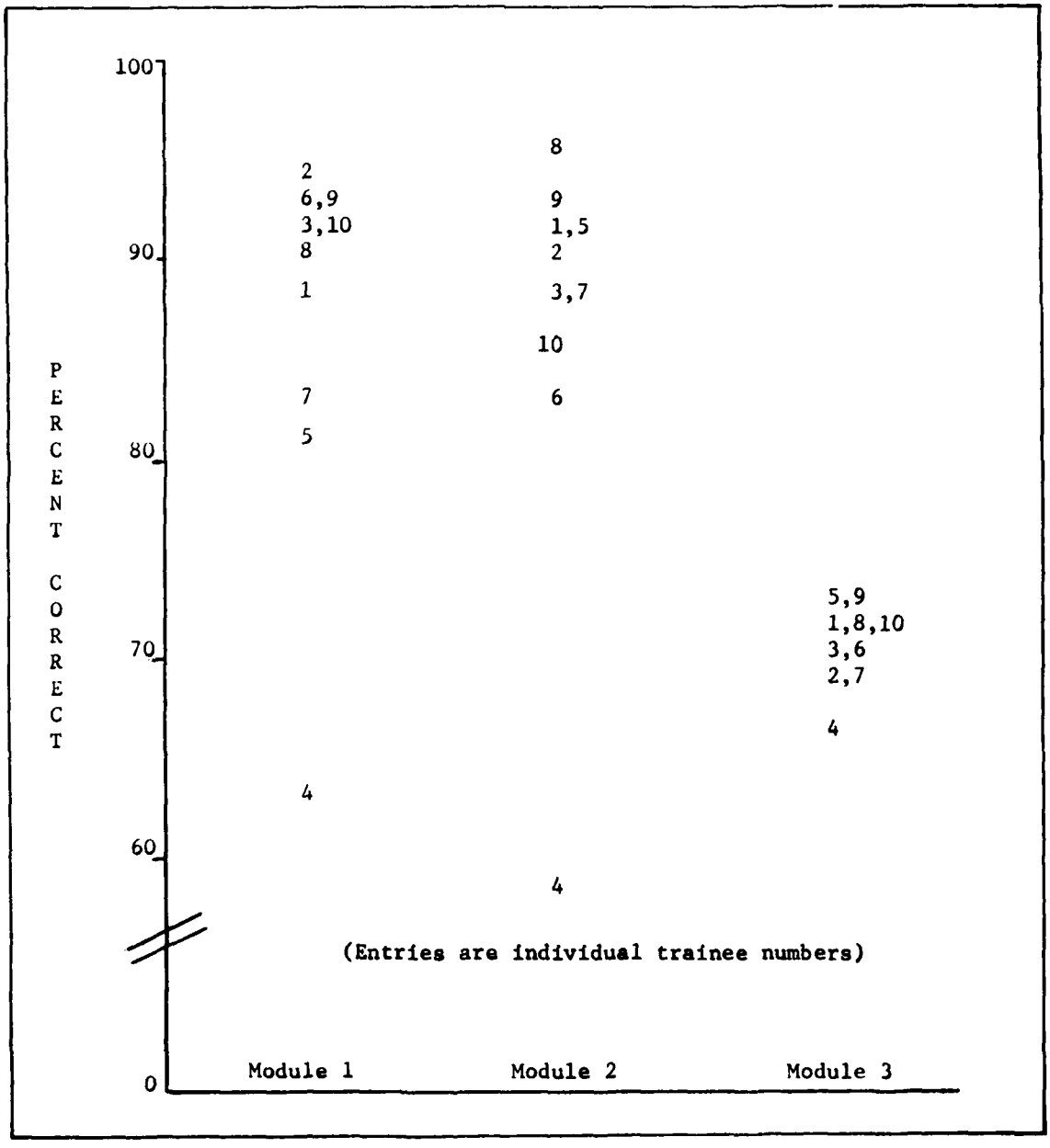

Figure 6. Frequency Distribution of Module Test Scores (Hypothetical).

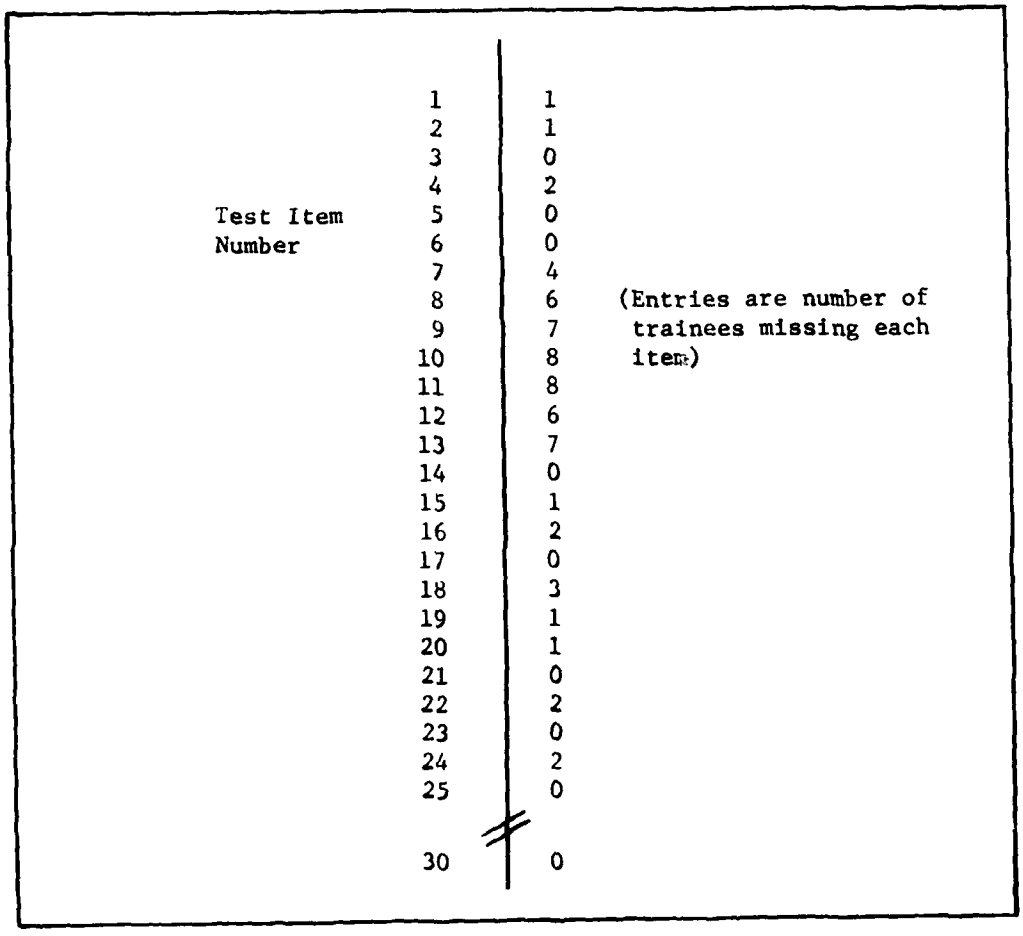

Figure 7. Frequency Distribution of Error Scores on Test Items for Module Test 3 (Hypothetical).

What Attitudes do Trainees Have Toward the TACFIRE AI Courseware?

Answer to this question are obtained by compiling and analyzing the responses to the TACFIRE AI Debriefing Questionnaire. At the same time, it will also identify particular problems, if they exist, which can be analyzed and corrected.

The techniques for the analysis are the same previously stated. A summary sheet is prepared and frequency distributions of the responses to each item are prepared along with the mean and range of values for each response. These are supplemented by the responses of the trainees to the open ended questions and the additional comments they make.

If the responses of the trainees show that they like the TACFIRE AI course and have little or no difficulty in taking the course, then the TACFIRE AI course can be considered accepted by the trainees. of particular interest would be the relation between liking the course and test scores, between age and liking the course, length of service and liking the course, etc. These can be demonstrated by generating scatterplots showing the two variables under consideration. Because of the relatively small sample, these results can only be considered as showing a possible trend rather than conclusive.

OTHER CONSIDERATIONS

The effort expended on the evaluation study will show the effectiveness and acceptability of the TACFIRE AI courseware. there is another area which is of high interest to the Army: Skill Qualification Tests (SQT). Skill Qualification Tests are designed to evaluate the individual skill level as the individual performs in the operational setting.

It is recommended that the trainees who take the TACFIRE AI course have the opportunity to exercise their skills in an evaluative, operational setting. This would require the preparation of a scenario with both off-line (voice) and on-line (FO outputs) which would require the trainee to perform the operations covered by the course objectives. With this relatively small amount of added effort, the Army can obtain some valuable data regarding the effectiveness of the TACFIRE AI courseware in raising the skill level of the individual.

APPENDIX A

TACFIRE DEBRIEFING QUESTIONNAIRE

NAME AND GRADE _____ SSAN _____ _____

UNIT _____ PHONE _____

INTERVIEWER _____ DATE ____ _____

1. What did you think of the TACFIRE AI course that you have just completed?

_____

_____

_____

_____

_____

2. My attitude toward the course was that I . . .

( ) disliked it very much

( ) disliked it

( ) neither liked nor disliked it

( ) liked it

( ) liked it very much

3. Instructions for taking the course were . . .

( ) very difficult to understand

( ) difficult to understand

( ) borderline

( ) easy to understand

( ) very easy to understand

4. On which console did you take the TACFIRE AI course?

FM Module:	ACC	_____	VFMED	_____	MIOD _____
ATI Module:	ACC	_____	VFMED	_____	MIOD _____
AFU Module:	ACC	_____	VFMED	_____	MIOD _____
SPRT Module:	ACC	_____	VFMED	_____	MIOD _____
SYS Module:	ACC	_____	VFMED	_____	MIOD _____

5. Did you have any problems or difficulties in using the console or interacting with the computer?

( ) yes ( ) no

(If "yes" to item 5) please describe your most serious problem or difficulty.

_____

_____

6. The course covered five functional areas: fire missions, artillery target intelligence, ammunition and fire unit, support and system functions. Were any of these, or parts of these, particularly good, and tell why.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

7. Were any of the five particularly bad and tell why.

8. I think that this method of instruction/learning is . . .

( ) very effective
( ) effective
( ) borderline
( ) ineffective
( ) very ineffective

9. For satisfactory understanding of the subject being studied, the amount of <u>time</u> provided was:

( ) much too long
( ) fairly long
( ) about right
( ) fairly short
( ) much too short

10. For satisfactory understanding of the subject being studied, the amount of material (information) provided was:

( ) much too large
( ) fairly large
( ) about right
( ) fairly small
( ) much too small

11. The technical detail provided was:

( ) very satisfactory
( ) satisfactory
( ) borderline
( ) unsatisfactory
( ) very unsatisfactory

12. The organization of the material presented was:

( ) very satisfactory
( ) satisfactory
( ) borderline
( ) unsatisfactory
( ) very unsatisfactory

13. My understanding of the material presented was:

( ) very satisfactory
( ) satisfactory
( ) borderline
( ) unsatisfactory
( ) very unsatisfactory

14. The quantity of the off-line course exhibits provided was:

( ) very satisfactory
( ) satisfactory
( ) borderline
( ) unsatisfactory
( ) very unsatisfactory

15. Were any of the off-line course exhibits inaccurate?

( ) yes ( ) no
If yes, please describe: _____

_____

16. Were any of the off-line course exhibits irrelevant or unnecessary?

( ) yes ( ) no If yes, which? _____

_____

17. Can you think of any other off-line course exhibits that should be added to the set?

( ) yes ( ) no If yes, please describe: _____

_____

18. If you were at the Artillery Control Console (ACC) now, how well could you take the console actions covered in the course?

( ) very effectively
( ) effectively
( ) borderline
( ) ineffectively
( ) very ineffectively

19. Have you now learned enough about ACC operations that you are ready to operate it in the areas covered by the course?

( ) yes ( ) no ( ) not sure

20. If "no" or "not sure", what more do you need to be ready to operate the ACC in these areas?

_____

_____

_____

21. Have you ever had this kind of training before?

( ) yes ( ) no

22. Does this kind of training make Army instruction better?

( ) yes ( ) no

Why? _____

_____

_____

23. Is this kind of training interesting to you?

( ) yes ( ) no ( ) not sure

Why? _____

_____

_____

24. Does this kind of training make it easy for you to learn?

( ) yes ( ) no ( ) Don't know

Why? _____

_____

_____

25. Do you like this kind of training?

( ) yes ( ) no ( ) Undecided

Why? _____

_____

_____